SJM BIOLOGICAL CONSULTANTS

1 June 2014 SJMBC.900

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Subject: Results of a habitat assessment for the California Threatened Mohave Ground Squirrel (*Xerospermophilus mohavensis*) (MGS) at the approximately 594-acre Barren Ridge project site, located in the Fremont Valley area of Kern County, California. The parcel occurs in the northeast corner of the Mohave 7.5-minute USGS Quadrangle Map; the approximate center of the main part of the site is at UTM (NAD83) coordinate 11 0402746E/3896522N.The property also includes a linear alignment extending approximately 1.6 miles in a northeasterly direction from the northwest corner of the property (Figures 1 and 2).

Dear Ms. Mitchell:

This letter-report summarizes the results of a habitat assessment for the Mohave ground squirrel (MGS, *Spermophilus mohavensis*) on the property described above.

INTRODUCTION

The Barren Ridge property is located approximately 11 miles to the northeast of the community of Mojave and approximately seven miles northwest of California City, California. The southeastern portion of the property is crossed by State Highway 14 and a power line road with associated power line structures crosses the northwestern corner of the property. Elevation on the site ranges from approximately 730 meters (2372 feet) in the southeast to 820 meters (2665 feet) in the northwest. The site is surrounded on all sides by relatively undeveloped natural desert scrub habitat. The property slopes upward from the southeast to the northwest. Most of the site generally exhibits only minor topographic relief consisting of an undulating terrain of small ridges and intervening low areas; however, topography becomes more variable and noteworthy hills and intervening valleys are common as one proceeds from east to west, and especially in the area of the northeast-trending linear alignment.

Disturbed and ruderal areas occur along the highway, transmission corridor and dirt roads on the site. Though human use of the site is evident throughout, the project site has been comparatively minimally disturbed by human activity. A few rural access roads exist on site, a flood control channel has been constructed along the west side of SR-14 to capture storm-water flows, and scattered trash dump sites are present in relatively close proximity to SR-14. Evidence of grazing and recreational shooting also are present (Rincon 2011).

Soils on the property primarily consist of Cajon loamy sands and Arizo gravelly loamy sands, with a small area of Muroc sandy loam also being present (USGS Web Soil Survey). Although sand is the

fundamental soil type across the property, the grain size of the sands on the western side of SR14 appear somewhat larger than those on the eastern side, and rocks are considerably more abundant on the western slopes of the property than on its more eastern level to gently sloping parts. This may be due to the natural forces of erosion/deposition which would be expected to carry smaller soil particles farther downhill to the east over time. Nonetheless, none of the soils observed on the property would be classifiable as deep loose sand, which is the common substrate type occupied by e.g. the extensive MGS population at the nearby Edwards Air Force Base approximately 20 miles to the southeast. The soils on site tend instead to be somewhat consolidated and gravelly, and therefore form a harder ground surface (see photos in Appendix A).

The single primary (dominant) vegetation type throughout the property is creosote bush-white bur sage scrub (*Larrea tridentata, Ambrosia dumosa*, respectively) (Sawyer, Keeler-Wolf and Evens 2009) (see Appendix A for photos of the site). Although these two plants are the overall dominants on the site, various other shrub species (e.g. *Senna armata*) are found on the site, often in small aggregations that resemble distinct habitat types. However, for the purposes of the current assessment and report, these shrub aggregations are not identified as separate communities due to their limited distribution and size. Herb cover at the property was generally low during the field assessment, and many shrubs were observed to lack leaves (see Appendix A photographs). The drought conditions that have prevailed for months in the region of the site have led to such conditions that are suboptimal for MGS. A variety of non-dominant representative plant species observed at regular interval across the site during the habitat assessment include the following:

Herbs (forbs and grasses)
Amsinckia tesselata - fiddleneck
Erodium cicutarium - filaree
Chorizanthe brevicornu - brittle spineflower
Eriastrum eremicum - desert woollystar
Saliva columbariae - chia
Bromus madritensis rubens – red brome
Bromus diandrus – ripgut
Bromus tectorum - cheat grass
Vulpia myuros - rat-tail fescue

Shrubs
Ephedra sp. – Mormon tea
Acamptopappus sphaerocephalus - goldenhead
Senna armata - desert senna
Cylindropuntia echinocarpa - silver cholla
Eriogonum fasciculatum – California buckwheat
Atriplex spp. - saltbush
Lepidospartum squamatum - scalebroom
Hymenoclea salsola - cheesebush
Lycium andersonii - Anderson's desert thorn

BACKGROUND ON THE MOHAVE GROUND SQUIRREL

Habitat

The Mohave ground squirrel (MGS) is a small ground squirrel (approximately 9 inches long) that is readily distinguished from the more common sympatric antelope ground squirrel (*Ammospermophilus*

leucurus, AGS) by the absence of stripes or spots. The MGS occurs in the Mojave Desert in parts of Inyo, Kern, Los Angeles and San Bernardino counties. Gustafson (1993) described the species' range limits as Olancha (northwest), Avawatz Mountains (northeast), Palmdale (southwest), and Lucerne Valley (southeast). Leitner (2008) provided details of this distribution in his summarizing status review report.

The MGS is active only during the spring-summer months and spends most of the year (approximately 7 months) aestivating/hibernating below ground. During drought years, when shrub growth is minimal and herb growth is low or nonexistent, adults do not reproduce and disappear from the surface (enter aestivation/hibernation) earlier in the season than during years of abundant rainfall. During higher rainfall years, which produce abundant shrub and herb growth, all females and even some yearlings breed, and individuals disappear from the surface somewhat later than during periods of low rainfall and low herb growth.

Mohave ground squirrels prefer deep sandy to sandy-gravelly soils on flat to moderately sloping terrain and generally avoid rocky areas (Best 1995; MGSWG 2011). Nonetheless, although typically avoidant of rocky terrain, it apparently will traverse such substrates during dispersal movements (Leitner, pers. comm., as cited in Laabs 1998; Leitner and Harris 2005). The species is not known to occupy areas of desert pavement, and generally avoids completely unvegetated larger dry lake beds (MGSWG 2006). Soil characteristics are particularly important because the MGS constructs burrows in order to provide for temperature regulation and avoid predators, as well as for use during the aestivation/hibernation season (USFWS 2011).

The MGS is known to occur in a number of habitat types throughout its range, including (a) most often, Mojave Creosote Scrub (dominated by creosote bush, *Larrea tridentata*, and other perennial shrubs) and Joshua tree woodland, which includes Joshua trees (*Yucca brevifolia*) at a range of densities and in association with a variety of shrub species, (b) Desert Saltbush Scrub, dominated by various species of saltbush (*Atriplex* spp.), (c) Desert Sink Scrub, similar to saltbush scrub, but sparser and growing on poorly drained soils with high alkalinity, (d) Desert Greasewood Scrub, with sparse vegetation and generally located on valley bottoms and dry lake beds, and (e) Shadscale Scrub, dominated by *Atriplex* species (Best 1995; USFWS 2011; MGSWG 2006). The species typically occupies areas with open vegetative cover and smaller shrubs (< 2 feet) in height, spaced approximately 6 to 9 meters (20 to 30 feet) apart (Best 1995; Burt 1936); although creosote bush in such habitats is invariably considerably taller. The species has been recorded in close proximity to agricultural fields, where an abundant food supply is available (Gustafson 1993).

Project Site in Relation to Known Occupied MGS Locations

The project site occurs within and at the western edge of the historical range of MGS (Gustafson 1993; Leitner 2008). According to the CNDDB, there are no MGS locality records in the immediate vicinity of the Barren Ridge project site, although this could reflect the absence of surveys in this specific area. The nearest MGS records in the CNDDB occur at distances of approximately 4-6 miles to the southeast, southwest, north and east. Figure 3 shows the various BLM Desert Plan Conservation Areas, including those for the MGS. The nearest identified conservation area occurs immediately north of the northern end of the Barren Ridge property linear alignment and approximately 2-3 miles northward of the northeast corner of the main part of the property (Figure 3).

Leitner's (2008) review of the status of the Mohave ground squirrel identified the following two types of known populations based on analysis of 1,140 trapping sessions carried out between 1998 and 2007: (1) Identified Core Populations and (2) Other Known Populations. The nearest Identified Core Population is the Little Dixie Wash Core Area, approximately 10 miles north of the project site. The Edwards Air Force Base Core Area is located approximately 20 miles to the south east of the project site.

METHODS

This assessment was based on a review of museum and other locality records for the MGS, and an assessment of the habitat on the site. Prior to the site visit, the literature was reviewed to determine whether MGS have been recorded in the vicinity of the project site. Records were examined in the California Natural Diversity Database (CNDDB 2011) and the on-line database of museum mammal specimens (MANIS 2009). Leitner's (2008) status update, which provides a summary of MGS capture results across the species range for the period 1998-2007, also was reviewed.

A field-based habitat assessment that examined soil, vegetation, topographic and disturbance features was carried out to assess the suitability of habitat on the Barren Ridge property and surrounding area for MGS. During the field visit to the project site, a visual and auditory (MGS emit a high pitched whistle call that can often be heard at considerable distance) survey was conducted in search of evidence of the presence of the MGS. The field assessment was carried out on 28-30 April by Stephen J. Montgomery, who holds a California Department of Fish and Wildlife (CDFW) Memorandum of Understanding (MOU) authorizing field work and trapping of the Mohave ground squirrel. The weather at the time of the survey included warmer air temperatures ranging from 60-87F, low to moderate wind speeds, and cloud cover ranging from 0-20%. A live trapping survey was not carried out as part of the assessment.

RESULTS

Weather during the field assessment on 28-30 April 2014 included warm air temperatures ranging from 60-87F, low to moderate wind speeds, and cloud cover ranging from 0-20%.

No MGS were observed or heard during the habitat assessment. The project site exhibits desert scrub habitat conditions and sandy-gravelly soils that are generally suitable for the species (see Appendix A for photographs of the site). The surrounding lands also exhibit desert scrub habitats similar to those on the property, although the terrain to the west eventually transitions into very steep mountainous topography that is unsuitable for MGS.

CONCLUSION

The project site occurs at the extreme western edge of the currently described range of the Mohave ground squirrel and exhibits habitat conditions generally suitable for the species. Although habitats on the property may be less than optimal for the species, due to more consolidated soils and sloping topography in some areas, the site cannot be excluded as potentially occupied by MGS. Thus, there is a potential for the species to occur on the property. Since the property exhibits more level topography in its eastern section in the area of SR-14, the likelihood of MGS occurrence may be higher in this part of the site. It would be necessary to conduct a trapping survey encompassing the highest quality available MGS habitat on the property to determine presence/absence of the species at this site.

The MGS may presently be absent on the property. However, since MGS are known to show within-day movements of up to 1.5 km and regularly move more than several hundred meters in a day, and are known to move several kilometers during dispersal events (Harris and Leitner 2004), it is possible that individual MGS could move onto the property over time, primarily from occupied habitats to the east, south and/or north.

Please contact me if you have any questions concerning this report or the associated habitat assessment.

Sincerely,

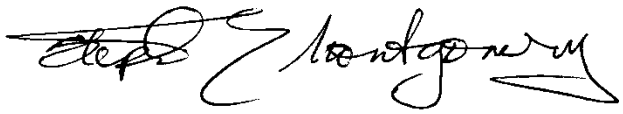

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FIGURE 1. VICINITY MAP FOR THE BARREN RIDGE PROPERTY

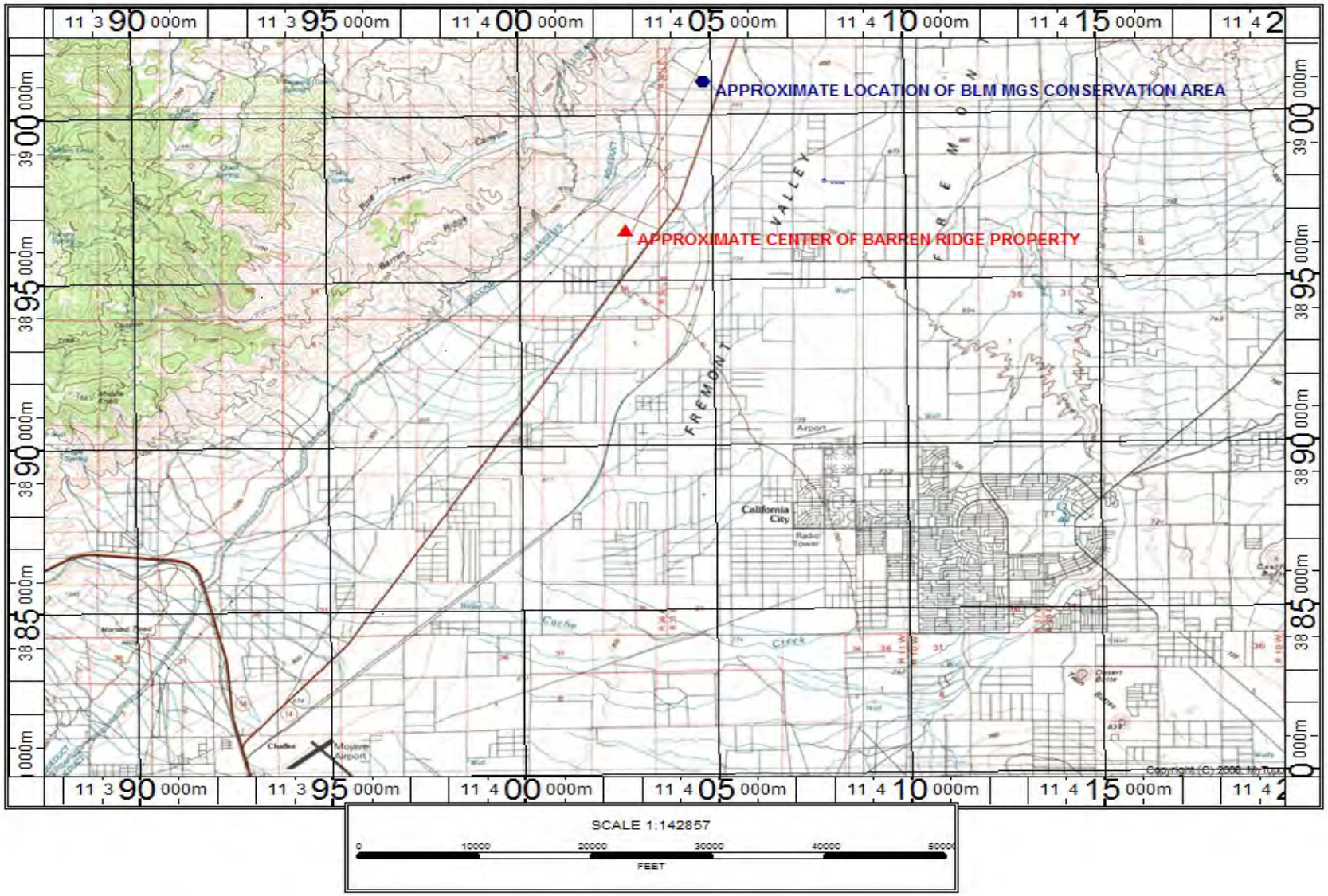

FIGURE 2. AERIAL VIEW OF THE BARREN RIDGE PROPERTY

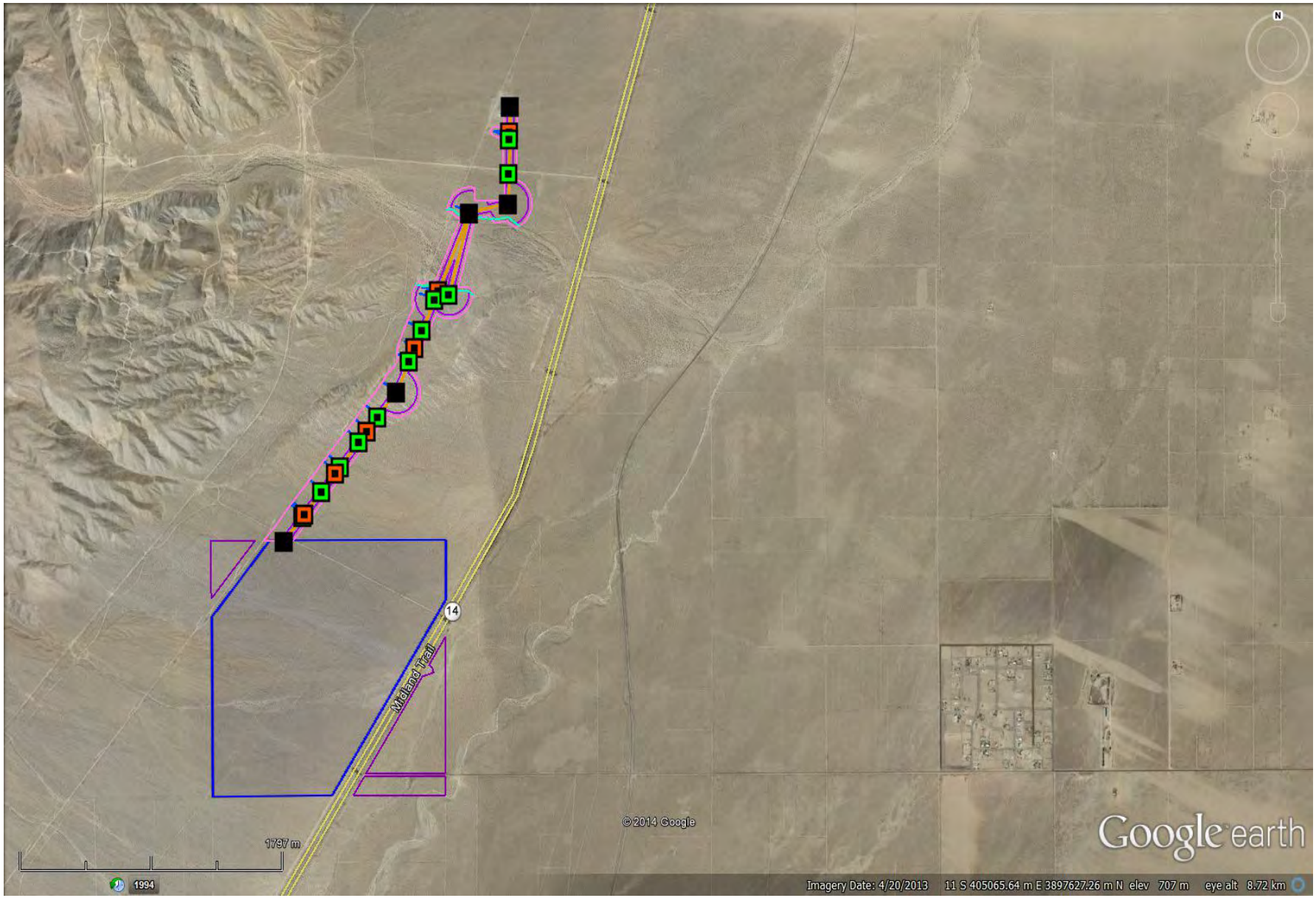

FIGURE 3. DESERT PLAN ALTERNATIVE B CONSERVATION AREAS

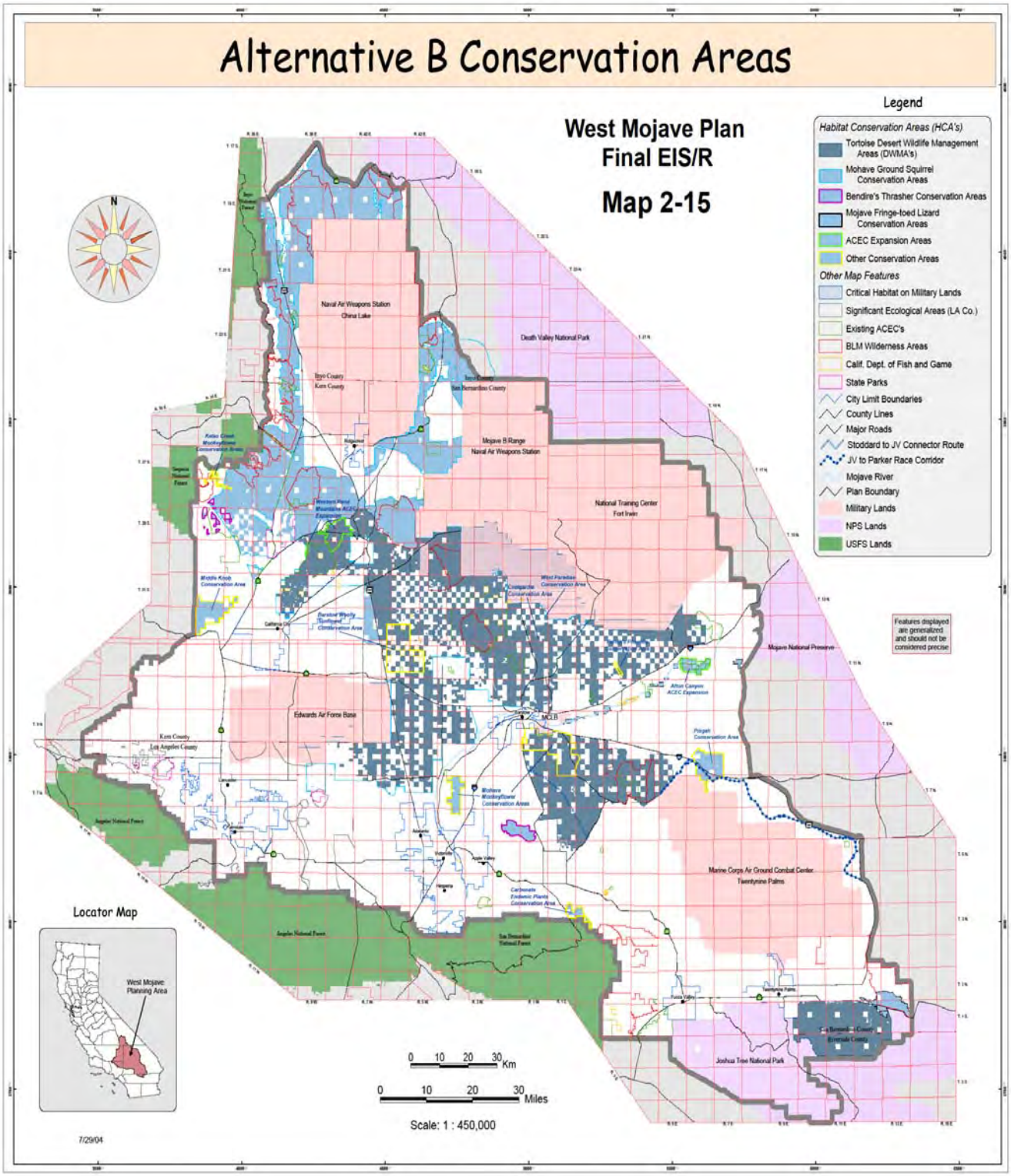

FIGURE 4. KNOWN MGS OCCURRENCES IN THE VICINITY OF THE BARREN RIDGE PROPERTY

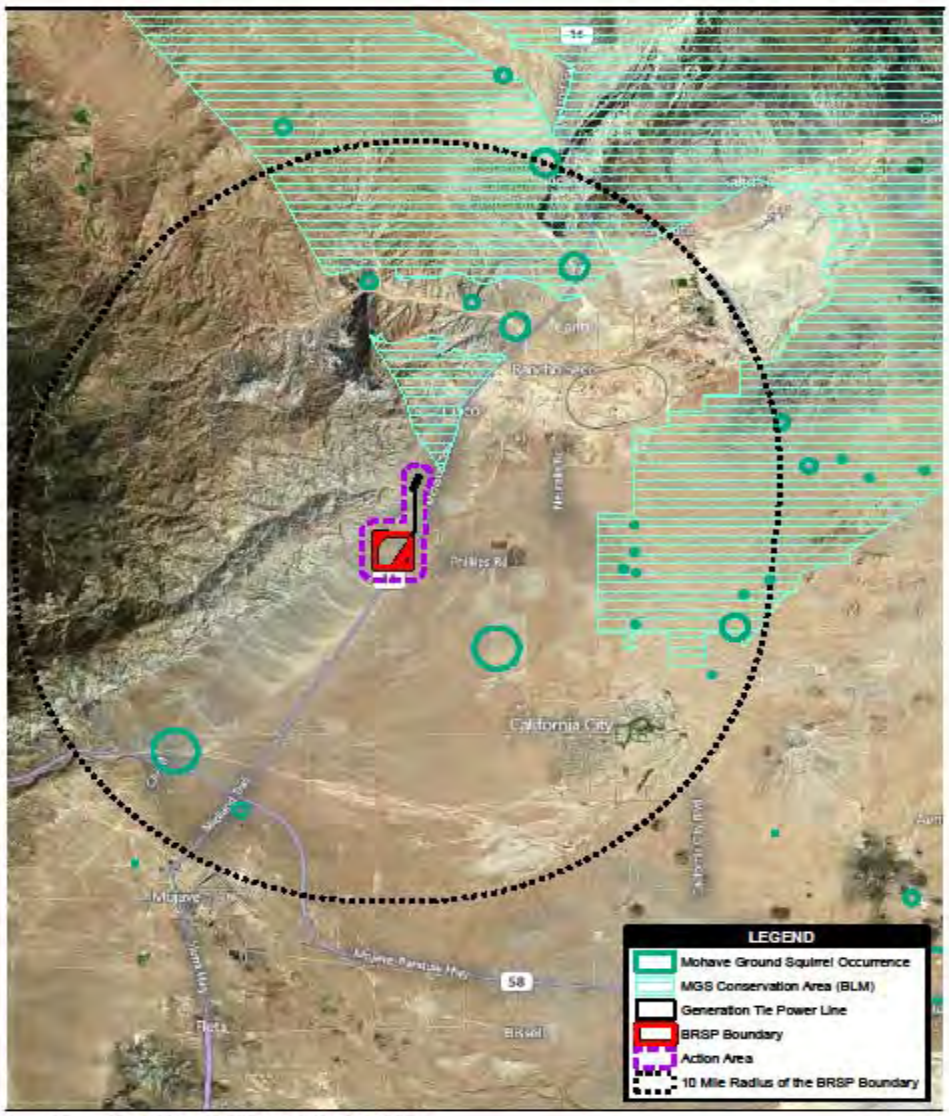

Figure 9
Recorded Occurrences of Mohave Ground Squirrel Near the Action Area

Barren Ridge Solar Project - Application for Incidental Take of Threatened and Endangered Species

APPENDIX A

(photographs of the Barren Ridge property – May 2014)

Creosote scrub habitat in the eastern part of the property

Creosote scrub habitat (Senna dominated in lower photo) in the eastern part of the property

Long-range view of the creosote scrub habitat on the property looking northwest toward the northern linear alignment

Close-up showing common gravelly soil surface on the property

Power line road that crosses the northwest corner of the property, looking northward